MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

# MGA
# BULLETIN

JULY, 1955 · NUMBER 67

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1 0 JUL 1955

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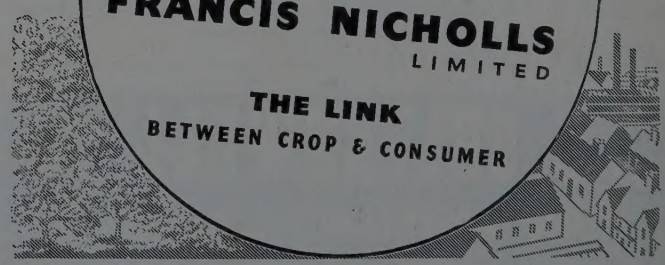

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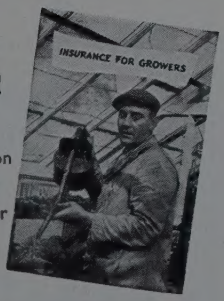


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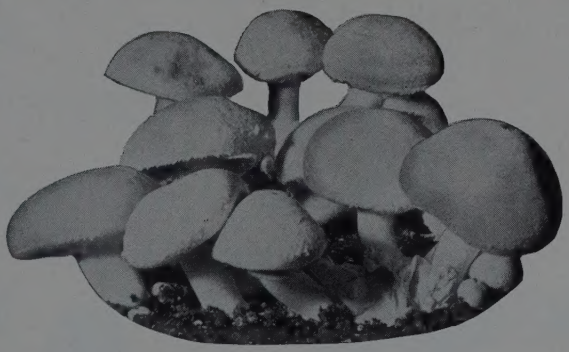

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JULY · 1955
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## EDITORIAL

# SURRENDER OF A PRINCIPLE

Whilst, at the moment, the agricultural industry in general appears to have accepted the recent unanimous decision of the Agricultural Wages Board to concede the demand of the National Agricultural Workers' Union for full adult minimum pay for male workers at the age of 20 years, instead of the generally accepted age of 21 years, this decision may well have far reaching repercussions throughout industry as a whole, as well as within the agricultural industry itself.

The point at issue in this demand, now conceded, was one of principle and although it may well be claimed that, in making this concession, and that on the question of overtime rates, the terms now accepted by the workers' union represents but a comparatively small amount compared with the original demands, only a fool would expect the matter to remain there and there is no doubt at all that, having gained this valuable ground, further new increases will be demanded in the not too distant future.

However difficult the problem, the conceding of such an important principle as the long accepted age of 21 years as reaching maturity and full pay, by right of age rather than skill or labour in general, is of paramount importance and, without doubt, the consequences will spread like an octopus.

Already hard pushed, the horticultural industry is pushed still further, and those in responsible positions must seek new ways and means of keeping expenses down if they are to survive.

In matters such as this, the heart of it all is what matters most. In this the heart of the trouble lays in the inability of those in prime charge of this country to halt the vicious spiral of wages and prices which threatens to engulf the whole structure of the land. Some day, and in the very near future, this problem looks like becoming such that it cannot be avoided and positive action will have to be taken. The pity of it all is that this positive action for which industry in general is crying out, is so long delayed. The day when pleas for common sense sufficed has long since passed. Since, quite obviously, the term " common sense "

is now in itself a misnomer as the state of mind which it implies is no longer common and bids fair to become a rarity, the time now is for firm action and it is high time that a directive on these lines was issued by those who are in charge and who, by public vote, have again been placed in power in this country.

A rock-like principle has been swept away and sand, shifting sand, offered as a replacement. W.R.A.

## CORRESPONDENCE

In the May edition of the " Bulletin " Mr. Fred. Atkins in his invaluable Alphabet arrived at the letter " S " and included the word sludge in association with the name of this Company. It is perfectly true that we handle the whole production of the Colne Valley Board but the activator in question, based on the MRA No. 1 formula, uses ACTIVATED sludge in place of dried blood. We feel that, in order to avoid any confusion in the minds of your readers, we should point out the significance of the word " activated," describing as it does a product entirely different to the one usually referred to as sludge.

The plant involved in its manufacture is probably the largest and most complete installation outside U.S.A. and is the only one in Great Britain. Lack of space forbids a complete technical description of the process but it is produced from the liquid and lighter suspended solids which have been separated from the heavier solids and grits, etc. This liquid is passed through special tanks where over 15,000 cubic feet of air per minute are pumped through it in the presence of aerobic bacteria. These micro-organisms consume it in the 12 hours it takes to process and during this time multiply until the count in a teaspoonful would approach the billion mark.

They are then filtered and flash dried at a temperature giving complete sterilisation. The analysis is high, all pathogens are destroyed and the result is a fine black powder of low moisture content.

It may surprise some readers to learn that in America it is used for feeding purposes and valuable pharmaceutical products, such as Vitamin B 12, are extracted from it.

Considerable and thorough testing in several fields of horticulture, etc., has gone on during the last three years since it was first produced and especially in the last year or so when it has been on the market, and some exceptional results have been obtained.

BRANTOM, SHIRLEY & CO. LTD.,
V. L. BARROW,
*Manager, Fertiliser Division.*

## 1 lb. TO THE SQUARE INCH ! ! !

Last month Mr. S. D. Griffin of Mount Pleasant, Biggin Hill, Kent, picked a single mushroom which weighed 1¼ lb. It was the only mushroom on the bed and Mr. Griffin could offer no explanation for its appearance or its solitary state, let alone its size.

# KENT FARM WALK

MGA members, their wives, farm foreman and others made up a total company of about 100 for a farm walk which took place at Bilting Mushrooms Ltd., Bilting, near Ashford, Kent, on Saturday, 4th June.

The wonder of it was that, in spite of the rail strike, so many members were able to make the journey and to visit this well adapted farm, situated in particularly delightful Kent surroundings.

Whilst there was general regret that two French members who had intended to make the journey were prevented from doing so because of the rail strike, those present came from over a wide area and two members made the long journey from Durham by rail as did a small party from Yorkshire.

Among the visitors was Mrs. E. Baldwin, who, with her husband, runs a mushroom farm at Hillcrest, Natal, South Africa. Mrs. Baldwin is on a visit to this country and this was her first close examination of an English mushroom farm. After the walk she gave a short talk, expressing her regret that there was, in South Africa, no comparable organisation to the MGA. She had, she said, been greatly impressed with what she had seen and with the hospitality extended.

Before the tour of the farm commenced Mr. G. W. Baker, Vice-Chairman of the MGA, welcomed the visitors and apologised for the

Picture taken at the Kent Farm Walk

unavoidable absence of the Chairman, Capt. G. P. Lawrence. Mr. Baker introduced Mr. G. V. Allen on whose farm the walk took place.

Mr. Allen explained that, with the new buildings just completed, the farm totalled between 24,000 and 25,000 sq. ft. Mr. Allen started the farm in 1938, and by August, 1939, it consisted of only two sheds each of 3,000 sq. ft. of shelves. The farm remained at that area whilst Mr. Allen was on active service during the war but, on his return at the end of 1944, he immediately set about a programme of expansion and two more sheds, each of 3,000 sq. ft. and again of shelves were added. About four years ago, following severe attacks of Truffle, Mr. Allen decided to go over to trays and has never regretted it. Two spawn running sheds were added and the compost shed was enlarged. About 18 months ago the first two asbestos Nissen type sheds were added and, during the past few months a further enlargement of the compost shed took place in order to cope with the increasing quantities of manure and to permit the use of larger compost turning machinery. Hand in hand with this expansion went the building of three more growing sheds —which will come into production within the next few weeks—and the provision of a new steam room. This latest addition of some 6,300 sq. ft. of cropping area will, Mr. Allen expects, be run without any addition to his male staff. This will be possible, not only because of the increased mechanisation in the compost turning shed, but also because of the loyalty and keenness of the staff.

Each growing shed on the farm is filled once in every eleven weeks and this cropping cycle is maintained. Output from the Nissen type houses, using fish boxes for trays, is $1\frac{1}{2}$ lb. per sq. ft. in just over six weeks picking period. The shallower trays used in the old houses originally designed for shelf growing, average 4,200 lb. from 3,500 sq. ft., again in six weeks picking. Peak heating is carried out with live steam and what is soon to be converted to a fully automatic steam boiler, oil fired. Trays are moved at all stages by roller conveyors.

Mrs. E. Baldwin, from South Africa, chatting to Mr. G. W. Baker, MGA Vice Chairman.

What does Mr. Allen now want most? "Above all I want a machine to help in the actual filling of trays" he said. Casing on his farm has, for the past four years consisted of peat and chalk. Horse manure is the basis of the compost.

Afterwards about 80 members sat down to tea at Wye and later Mr. A. deB. Hovell, of Church Farm Nurseries, Rustington, Kent, acted as Question Master for a Brains Trust. Among those who answered questions were:—Mr. B. D. Moreton (Advisory Entomologist, Ministry of Agriculture, Wye), Messrs. G. V. Allen, G. W. Baker, F. Bleazard, E. A. Gook, H. G. Boxall and the Secretary. The latter expressed thanks to Mrs. Allen and Mrs. Baker for arranging the tea, the Kent, Surrey and East Sussex Area Committee for making the general arrangements, and Mr. Hovell for carrying out the duties of Question Master.

# MR. LEO CONDON

We much regret to record the death of Mr. Leo Condon, Editor for some years of *The Grower*. Mr. Condon, who leaves a wife and children, died suddenly on 22nd June. He was 52.

Born in India Mr. Condon, one time Fleet Street journalist and assistant editor to the *Sunday Pictorial*, turned to horticultural journalism and eventually became Editor of *The Grower* in 1944.

He was extremely popular throughout the horticultural industry and keenly interested in the cultivation of mushrooms. Always too he was willing to assist the MGA whenever possible.

# YOUR PUBLICITY CONTRIBUTORS

The MGA Publicity Sub-Committee has pleasure in calling the attention of all those connected with the Mushroom Industry, to the following list of contributors to the Association's PUBLICITY FUND.

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# INSURANCE FOR MGA MEMBERS

" What the mind does not know the heart does not grieve over," they say. This may be true philosophy but it is not much use as a business maxim—especially if you find yourself under insured after a serious fire, or facing a large claim arising from your liability to the public. That is happening to someone, somewhere, almost every day. It can happen to any member of the MGA.

The Association is a specialist branch of the National Farmers' Union and yet we believe that, unlike NFU members who invariably insure with their own insurance society, relatively few members of the MGA do so. Why is this? The NFU Mutual Insurance Society is a very large organisation with assets of £11,000,000 and through specialising in insurances for every branch of agriculture and horticulture is able to give its members the finest insurance for their own particular needs at premiums that are no higher than those required for ordinary insurance and usually are lower. Every member of the MGA is entitled to the same privileges in this respect as ordinary members of the NFU. By placing his insurances with the NFU Mutual he can obtain first-rate cover at very reasonable cost. These notes may help growers of mushrooms to assess their insurance needs.

FIRE INSURANCE is an important item especially for a member who owns property. Most growers think that they are sufficiently covered but it is surprisingly easy to be under-insured. Even when there is not a total loss to-day's costs must be considered for the necessary rebuilding, and foresight can prevent a serious financial setback. Fire insurance on moveables, growing crops and the like should be overhauled not less than once a year. Stocks of baskets and other containers burn easily. So does a heap of dry manure. Even artificial manure, not especially combustible, can be ruined by water damage.

GLASSHOUSE INSURANCE will interest members who have a horticultural trade and a comprehensive policy for glasshouses, lights and cloches is available for every owner of glass. Amongst the risks covered are destruction or damage by storm and tempest, including hail and weight of snow, and by aircraft, fire or lightning. The owner is not required to bear the first part of any loss and he may undertake the immediate replacement of structure and glass damaged by the insured perils thus ensuring the minimum of interruption to his operations.

TRANSIT RISKS are a most important item to any grower and if he transports his own produce he does well to guard against dangers that may rob him of the well-earned reward of his work. Pilfering can be a nuisance because mushrooms are easily disposed of and difficult to identify. Hold-ups, too, are not confined to the films nowadays and the transit of wages between bank and home presents a risk that it pays to insure.

MOTOR INSURANCE is of interest to almost everybody. A member who contents himself with third-party cover has to pay for

damage done to his vehicle which may make a nasty hole in his profits through no fault of his own. Comprehensive cover brings with it many other benefits and relieves one of worry.

It is essential to remember that any tractor or self-propelled implement ought to be insured even though its use may normally be confined to the owner's premises. The law is explicit that if any tractor or power-driven implement is driven on any part of the highway, including the verges, and even if it simply crosses a road dividing two fields, it must be insured.

HOUSEHOLDER'S COMPREHENSIVE INSURANCE is an ideal investment for the busy member who likes everything lined up under one premium and with one renewal date. The NFU Mutual's Unity policy is planned to meet such a need; its standard cover for buildings includes the risks of fire, lightning, aircraft, bursting and overflowing of water pipes and apparatus, liability to the public as a householder, and the like. When contents are insured all those risks are included and, in addition, flood, breakage of glass, accidents to servants, personal liability and other necessary cover.

LIFE ASSURANCE to-day is more worthwhile than ever before. The fact that the profit offered on every insurance is not normally subject to tax and the generous income tax rebate allowed in respect of the premiums on most policies make life assurance a lucrative investment. Whether the mushroom grower seeks security for his family or for his estate or whether he wishes to make provision for his children's education or his own retirement, the NFU Mutual's experts can provide a life assurance contract that will meet his requirements.

This article mentions only a few of the attractive policies issued by the NFU Mutual which, specialising as it does exclusively in meeting the needs of all branches of agriculture, is able to do so with complete efficiency. In addition, members of the MGA are entitled to obtain from the Society, expert advice on any insurance matter free and without obligation. For all insurance service members should therefore write to the secretary of the Association or direct to the Society, mentioning the MGA.

---

# AT CHELSEA & HORSHAM

By courtesy of Mr. V. L. Barrow (Messrs. Brantom, Shirley & Co. Ltd., Battersea), mushrooms were displayed on the firm's stand at the Chelsea Flower Show and again last month and the Royal Counties and Sussex County Show at Horsham. In each case publicity literature was distributed.

Pre-packed mushrooms, supplied by the MGA, were also prominently displayed in the striking NFU Market Produce Show Society's pyramid display which attracted great attention.

# PUBLICITY IN FRANCE

## *M. MENETEAU REPORTS ON CAMPAIGN

We of the French Federation's Executive would like all our colleagues to understand the debt they owe their Publicity Committee. For each day that they sell their mushrooms at a better price, they owe their gain to those who have busied themselves with publicity and to those who inaugurated the campaign.

Where prices are concerned we are happy to give you the statistics from the Central Paris Markets for February:—

In 1954: Arrivals 377 tons, Average Price Francs 208 per kilo.
In 1955: Arrivals 413 tons, Average Price Francs 233 per kilo.

An increase of 36 tons in the arrivals and in spite of this 25 francs rise in the price per kilo.

For the canning mushrooms we report as much as 195 francs per kilo for good quality taken at the Farm, otherwise we note 170 to 180 francs as against 175 on the one hand and 160-165 francs on the other for last year at the same time.

Every day we get indications which show that the demand is increasing.

However, we must not go to sleep on these results. They show that the campaign has gone according to plan. We must perfect this campaign and progressively increase the demand.

The Publicity Committee has still got a vast programme quite ready for the expansion of the campaign.

Recently we were promised the help of the commission agents and representative agents for the year 1955. The Federation of Canners also have given us their co-operation, and at the same time congratulated us on the way in which we had conducted our campaign as well as for the results obtained.

1955, with all this co-operation, should see brought to fruition a new campaign, and the next few days will show what we are going to do.

Let us hope that this campaign with its results palpable to all, will make our colleagues understand that Publicity is the only way to save the Association. We haven't all got the same interests in Publicity; certain people didn't see the necessity of it in the beginning, they had already organised sales which permitted them to attain prices unknown to the majority. We want everyone to be able to profit from better prices, the town mushroom grower as well as the country one. Our activities are for everyone, principally for those who until now have been disinherited. Our big reward would be the confidence of those people and their unanimous support.

**Taken from the March issue of the French Federation Bulletin.*

# PUBLICITY FUND TOTAL £1,255-14-9

By 30th June, the amount collected by various means for the Publicity Fund had reached a total of £1,255 14s. 9d., and the expenditure to date is £378 14s. 1d., leaving a balance in hand of £877 4s. 1d.

The principle items of expenditure are:—An allocation for administrative and office expenses (£150), Printing (£50), Tunbridge Wells (£75), Food Fair (£21), Advertising (£21), the remainder being largely costs in connection with obtaining publicity in the Press, Radio, Television, Demonstrations, etc.

Chairman of the Publicity Sub-Committee, Mr. G. V. Reed, commenting on the amount so far raised, said: " We are *cheerfully dissatisfied.* We are cheerful and encouraged by the generous expressions of appreciation that such moneys and effort as have been expended have already brought good results but we anticipate better results later.

We are *dissatisfied* that we are unable to take full advantage of the abounding opportunities for obtaining excellent mushroom publicity which could be grasped if sufficient funds were available. Extra finance is a great problem and we hope to provide the solution to this at the Brighton Show. The way ahead will then be certain and unobstructed."

Now in the course of production are specially designed posters for use in shops and on vehicles: also " Dont-Peel-Cultivated-Mushrooms " slips, for free distribution to Grower Members. Thousands of recipe leaflets have been ordered, new leaflets are being prepared. Growers who organise displays at shows will be supplied with literature and given financial help, subject to the approval of the committee. Two thousands cookery demonstrators and others employed by the British Electrical Development Associated have received leaflets and recipes, so too have 800 listed hotels and catering establishments. On four successive occasions mushrooms have been on television and they are to appear on sponsored television. Gilbert Harding likes them—he said so in a " Twenty Questions " session.

Already a meeting has been held to see that mushrooms are prominently displayed at the 1956 Food Fair.

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| MORE PUBLICITY FUND CONTRIBUTIONS | £ | s. | d. |
|---|---|---|---|
| *Stable Manures Ltd., Lancing, Sussex and Newmarket, Suffolk (Manure Merchants) .. .. .. .. | 24 | 0 | 7 |
| *C. Snowden & Co., Ltd., Castlefolds Market, Sheffield (Salesmen) .. .. .. .. .. .. | 2 | 13 | 7 |
| *H. Dowson & Co. Ltd., St. Andrew's Street, Newcastle-on-Tyne (Salesmen) .. .. .. .. .. | 1 | 1 | 0 |
| *†H. Mount & Sons Ltd., Littlebourne, Canterbury (Spawn Merchants) | | | |
| *†Geo. Monro Ltd., Hertford Road, Waltham Cross (Sundriesmen) | | | |
| *Pinkerton's Scottish Mushroom Laboratories, Millerston, Glasgow (Spawn Merchants) | | | |

*Previous contributions already acknowledged

*†Amounts donated by spawn merchants are not, for obvious reasons, disclosed

# STRIKING EXPERIENCES

From reports received in the Bulletin office, growers, making the best of a bad situation, overcame the difficulties resulting from the rail strike with commendable promptitude and ingenuity. Teething troubles and slightly frayed tempers were inevitable in the early stages but, after the first week of the strike, supplies of mushrooms were being received at the markets fairly smoothly.

Chairman of the MGA, Capt. G. P. Lawrence, said " People were most co-operative, on the whole, and the thanks of all growers are due to the trade, salesmen, sundriesmen and others, for their efficient help."

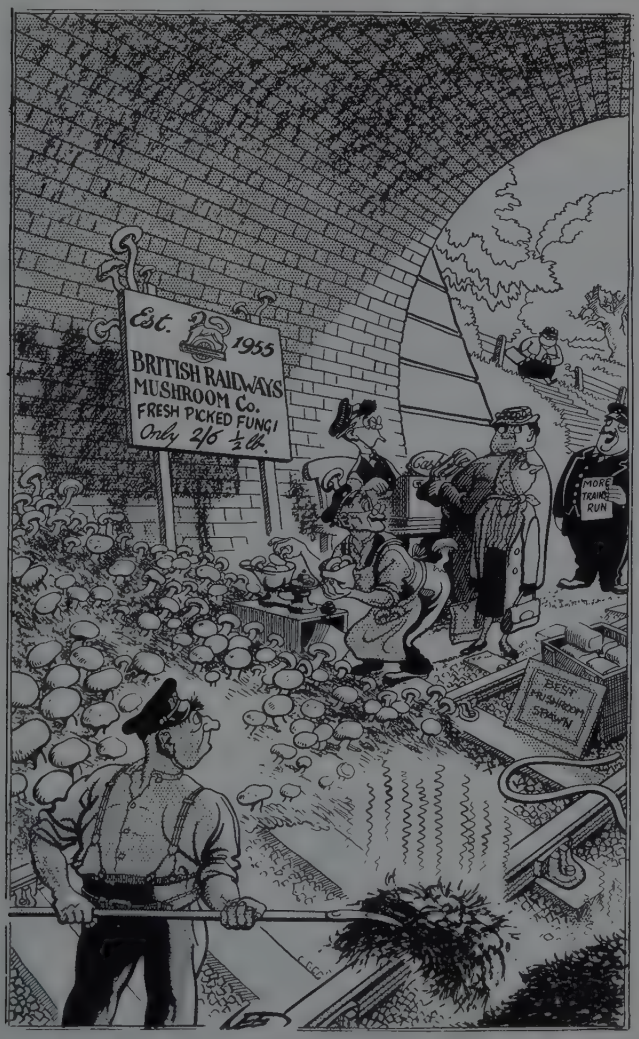
Many wholesale salesmen arranged their own transport and, where necessary, spawn suppliers made special deliveries.

Some growers made their own market deliveries in the early stages and thus, in the very early hours of the morning at Birmingham, Mr. N. R. Cooper met Mr. H. B. Luxmoore (Snowcap Mushrooms, Yaxley) and representatives of Aylesbury Mushrooms Ltd. (Mr. J. Stewart-Wood). "After a few nights with only four hours sleep my temper was wearing a little thin " says Mr. Cooper.

Here is how some members overcame the difficulties:—

Capt. G. P. Lawrence: Arrangements against a possible strike had been made earlier. My local wholesalers had undertaken to take them to Covent Garden three times a week—quite all right if you have a " fridge." They left at 2.30 in the morning! The firm concerned refused my offer of payment for transport saying " We're going up anyway, we don't want to make anything of the situation." Added Capt. Lawrence " It was a very nice gesture." Mr. G. W. Baker (Broadham Produce Co. Ltd., Oxted) comes out with a forthright " I would like to put in plain language what I think of the strike but it would not be fit for publication." After a strenuous day out with the family on Whit Monday he was deprived of sleep until 3 a.m. next morning, having taken his mushrooms by van and delivering personally to the various stands in London. Later, with the exception of Sundays, a train was available at 9 p.m. each night. Mr. G. V. Allen (Bilting Nurseries, Bilting, Kent), and neighbouring Mr. E. A. Gook (Badlesmere, Faversham), had transport laid on by their London salesmen, Mr. Allen's farm being used as a collecting centre. The Midland markets were not so easily accessible and Mr. Fred. C. Atkins (Noble Mushrooms Ltd., Yaxley) overcame the situation by means of privately-hired vans whilst one market salesman collected. Says F.C.A. " The improved condition in which the produce arrived at the markets will go some way to offset the extra cost involved." Added Mr. Atkins " The spawn people went out of their way to see that the cropping schedule was not interrupted." Mr. F. Bleazard (Blackpool) experienced little difficulty. With a large quantity of horticultural produce grown in his district, agents in Lancashire and Yorkshire collected with their own lorries aided by British Railways using their road vehicles. Added Mr. Bleazard "At least one spawn maker made frequent deliveries by road and spawn required at short notice could have been flown to Manchester." Mr. N. R. Cooper (Shadowlawn Products, Kimcote, Rugby): It was only during the first week there were difficulties and these were overcome by the simple procedure of " do it yourself." " I had some pleasant chats about mushrooms at 5 a.m. in Birmingham Market " he said. Messrs. Filmer (Lindfield Nurseries Ltd., Lindfield, Sussex) had little trouble, all their mushrooms being collected by their salesman. Further to the West, Mr. A. G. Pointing (Messrs. Agaric Ltd., Bradford-on-Avon) said the strike could not have come at a worse time. The end of Whitsuntide found them with plenty of mushrooms. They managed with their own transport but had to take on extra drivers. Later they were able to co-operate with another grower. Mr. G. V. Reed (Old Woking) had his salesman collect for the first few days and later rail transport was possible. Mr. Raymond Thompson (West Wittering) was able to get some mushrooms away to the London markets, but others had to go to Southampton "where, compared with London, the prices were shocking " said his Secretary.

# LONDON LAUGHS (No. 6,194) *By LEE*




**"Sorry, boys. 'Fraid your bit o' private enterprise has come unstuck. They're sending a train through here today."**

*The above is reproduced by kind permission of the London *Evening News*

# MUSHROOMS FROM THE NETHERWORLD

*By* **J. L. JONES, Bristol**

A feed of wild mushrooms is a country walk "bonus" which grows progressively rarer; the wild mushroom—*Psalliota campestris*—is a casualty of the new farming. The great plough-up of the old permanent pastures, the spread of the ley and particularly the eclipse of the horse have all contributed. The implements of modern husbandry have been the mushroom gatherer's bane: the hay-baler, for example, by eliminating the field ricks where the half decomposed staddles were often a rich source of edible fungi. To-day the lingering savour and succulence and highly nutritive qualities of mushrooms must be bought or grown to be enjoyed, and mushroom farming has spread to almost every county in Britain.

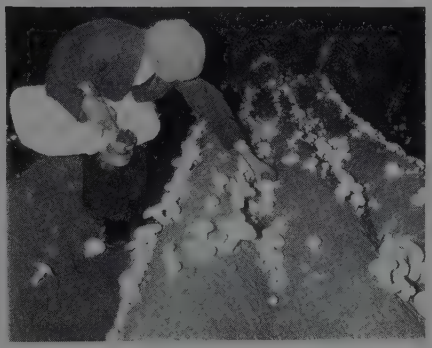
Based on its independence of sunlight, the mushroom "farm" embraces a variety of sites: the cellar and the garage, behind the staging in the glasshouse or in the potting shed, on a larger scale in the big brick, timber or asbestos layouts, and, of course, in the underground cave farms. A series of disused Bath Stone quarries near Bradford-on-Avon, in Wiltshire, provide what is probably the oldest example of continuous mushroom culture in Britain. They are not quarries in the usual sense, but mines from which the freestone has been hewn with no evidence of disturbance at the surface. The roofs remain self-supporting, and in places the limestone hill has been excavated to a distance of half a mile from the entrance. Mushroom growing was started here as early as 1870 when parts of the quarry were still being worked.

The limestone netherworld offers Agaric Ltd., the Wiltshire mushroom farm, many natural advantages. The temperature is practically unvarying and the relative humidity not far from maximum. It is dark, and while mushrooms do not need darkness to grow, they do have to be kept away from the desiccating and discolouring rays of the sun.

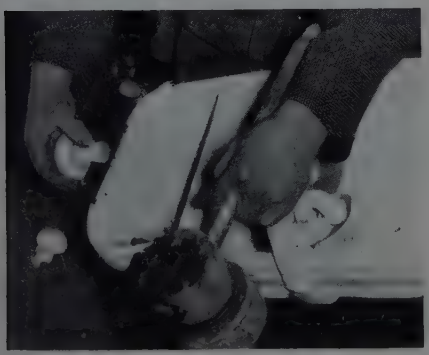
Broadly speaking, the mushroom farmer has two principal tasks: he must provide the mushroom with as nearly as possible the ideal host in which to grow, and he must offer it the best climate. The ideal growth medium must provide adequate nutrition, possess the right physical properties and be free from insects and competitive moulds. From the nutrition angle the basic difference between mushroom farming and

other cultures is the absence of chlorophyll in the growing body. Green plants in sunlight get much of their sustenance from the water and carbon dioxide in the atmosphere. The mushroom must have its food made available for it in the form of already prepared organic material.

The instrument for providing this is the compost heap and while progress is now being made in the use of the so-called synthetic composts, the availability of stable litter for producing compost is still a highly favourable factor in siting a mushroom farm. Composting in itself, however well managed, does not provide a uniformly sterile medium. There are necessary variations of surface and inner temperature. The material at the surface may be too cold to " work " and the inner masses may be temporarily short of oxygen for the right kind of fermentation in between turnings. To ensure a perfectly homogeneous sterile product, therefore, the compost, having completed natural fermentation, is stacked in trays in sealed sheds and pasteurised by steam. Having cooled to 75 degs. Fah., the doors are then opened and the compost is ready for spawning.



In the early days, the only spawn available was that harvested in the fields. Gathering it was virtually a distinct trade and the sites of intensive horse-labour—the mill-turning tracks, for example—were rich sources of mushroom spawn. The soil permeated with mycelium was dug out and sold to the growers, who then inoculated their beds with flakes of spawned mould. Pure culture spawn, though produced earlier, was not extensively on the market until about thirty years ago. The mushroom farmer is now able to buy certain " strains " of spawn, which, like corn seed and other plants, have been propagated vegetatively —in this case under aseptic laboratory conditions.



The spawning at Bradford-on-Avon is done by breaking the quart cartons of cultured

spawn into walnut-sized pieces and placing them about 2 ins. below the surface of the compost in the trays. These remain in the pastuerising shed for eighteen days, allowing the spawn to "run," and are then taken into the cave scheduled for cropping, tipped out on the floors and made up into ridged beds.

With the ridges made up, the next step is to case, or cap, them and this is done with a mixture of sand and ground limestone. The principal object of casing is to encourage the ramifying mycelium to form fruiting bodies. Emerging from the warm, nourishing compost into the world of sand and limestone, the mycelium is stimulated to the production of the spore producing mushrooms to ensure propagation. A further factor in casing with these materials is that the resultant mix is virtually naturally sterile and has the correct pH value.

From casing to picking, the care of the mushroom beds lies principally in ensuring that the " climate " is kept favourable for growth. This means the correct blend of water and air. In the early stages when the spawn is still running, watering is a precise and finicky affair and must be exceedingly light and gentle. While the amount must be enough to moisten the casing soil to the point of contact with the compost, it must not penetrate into the compost itself, or the mushroom may fail to develop.

The tendency of sand and ground limestone as a casing medium to dry out is offset by two factors in this underground mushroom farming. The sand itself is a local one; and being somewhat clayey in consistency holds moisture relatively well. Secondly, the relative humidity is generally not less than 90 per cent. inside the caves. Everything possible is done to maintain this high natural humidity, which is a highly valuable attribute of limestone caves for mushroom culture.

From spawning to the picking of the first mushrooms, about seven weeks elapse, and they crop in waves or flushes at ten-day intervals. Much of the success achieved by Agaric in cropping these caves over a long period undoubtedly derives from the fact that every quarry floor is rested one year in every two. The compost and casing soil are hauled away, and the entire block is cleaned and sterilised and the cropping moves on to the next quarry. Practised scientifically, with meticulous

attention to the laws of good husbandry—as far as they are known—the culture of mushrooms is now a fairly safe one. But continuing success depends on never letting up in the war against the competitive moulds and pests which are the biggest hazard. There is no luck, other than the ill sort, in this type of farming!

*The co-operation of "Sport & Country," in which this article recently appeared, is gratefully acknowledged. Mr. Jones, a Bristol journalist, wrote the article following a visit to Agaric Ltd., Bradford on Avon, Wilts. Mr. A. G. Pointing, who is a member of the MGA Executive Committee and who was formerly on the Board of the MRA, is the Managing Director of this Company. MGA members will be interested to learn that, later this year, a farm walk area meeting is to take place at these caves, by kind invitation of Mr. Pointing.—Ed.

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**I have been asked (many times) . . .**

# ABOUT SMALL MUSHROOMS

*By* **Dr. R. L. EDWARDS**

In case anyone should get too hopeful, I hasten to add that I do not know all the answers !

Most people are plagued by small mushrooms sometimes, some people nearly all the time. There are undoubtedly several known causes of small mushrooms, but they do not account for nearly all cases.

The first and simplest reason is lack of food material in the compost. Some very poor manure, by older standards, is being used now, and if it is not boosted there simply is not enough in it to produce good quality mushrooms.

Sometimes there is an automatic compensation for this in the form of a failure to form many mushrooms. If there are not many formed at a time, each one can be fed by a considerable bulk of compost and may reach a reasonable size. The logical (and observed) extension of this principle to the other extreme leads us to another cause of small mushrooms, the formation of too many pinheads. It is not quite as simple as that, because sometimes masses of pinheads are formed but many of them remain dormant, possibly developing in later flushes. But when a very large number do develop in the same flush they cannot all reach a good size. It may well be in our power, if we knew enough, to control the number of pinheads formed and developing, most probably by suitable watering and control of air conditions. Certainly these things can affect size, very obviously in some extreme cases. For example lack of air causes long-stalked mushrooms which bolt and open quickly to give small caps. On the other hand low temperature and high humidity tend to give slow growth and even slower opening, forming good solid mushrooms. I said this is a tendency ; it is not an unbreakable rule, and this effect may be outweighed by other factors.

In trying to assess the effects of management on size of the mushrooms it may be useful to analyse the growth processes which contribute to its formation.

First there is the formation of pinheads, and we have seen that the number of these can affect the final size. I do not think we have any clue at all as to the immediate cause of pinhead formation or to the factors which determine the number formed. Then they start to grow, and this can certainly be prevented by lack of water. I have seen this happen several times, the pinheads formed on the surface of the casing turning brown and dying, whereas in other cases similar pinhead formation with more liberal watering has developed into a good normal flush. It is sometimes said that failure of growth of pinheads may be due to disturbance of the mycelial strands which carry the mushroom's food supply from the compost. This may be true, but under some circumstances the mushroom has shown remarkable tolerance to such disturbance.

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# Mount

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In some unpublished experiments on the water relations of casing soil in Holland, casing soil was placed on a wire grid which was laid on the compost. From time to time this grid was lifted off the compost, complete with the casing and growing mushrooms, weighed, and then replaced. Strange as it may seem, and it certainly did to me, growth continued after this ill-treatment.

Once growth of the small mushroom has started, I think it must either continue without a pause until the mushroom opens, and spores are formed and dropped from the gills, or else the mushroom dies. Small pinheads can certainly remain dormant and start to grow a week or more after they were formed—I have seen it happen ; but I do not think they can do so after the cap has reached say the size of a well-grown garden pea. If at that or any larger size growth is interrupted then it is never resumed in a normal way. The mushroom may form gills and open in a rather spindly form, but it is quite clearly abnormal.

The next well-defined stage in growth is opening of the veil. Although there is still some increase in weight, including the stalk, after the veil opens, this is the beginning of the end of the mushroom's growth, and at this stage the size of the mushroom is fairly well determined. It is very much a matter for argument how far the size is fixed before this. I have heard it said that the final size (or perhaps the maximum possible size may have been meant—because obviously the final size could be reduced by ill-treatment) is determined quite early in the growth of the mushroom. Personally I rather doubt this, because I have on many occasions seen growth phenomena which strongly suggested that the size of the mushroom was being or had been affected by treatment during growth, particularly by watering. We all know that the thickness of the stalk of a normal healthy mushroom is quite closely related to the size of the cap. Sometimes the stalk is quite thin and the mushroom never looks like reaching more than an inch or two in diameter when fully open. In other cases the mushroom fattens up to form an almost spherical cap two inches across, on a stalk an inch thick, and is quite clearly going to form a large flat cap if left to do so.

But sometimes I have seen mushrooms which started off with a thin stalk fatten up, so that the upper half of the stalk was considerably thicker than its base, and the cap was in proportion to the thicker part of the stalk. There is no proof, but it seemed to me that these mushrooms had been lacking something, probably water, and they showed the benefit when this was supplied.

We all know the thick stemmed small capped mushrooms which are so abnormal that they are regarded with suspicion as possibly diseased ; but there are some which are generally normal in type, but with a stalk thick at the base tapering to a thin top and a smaller cap than the base of the stalk would have led us to expect. I suggest that these have been prevented from reaching their full potential size by lack of water after their growth had started, and they may include some of the small mushrooms about which we hear so many complaints.

There is another way in which I think watering may effect size, although it does not always happen and I do not know what conditions determine this. I have seen mushrooms watered a day or so before they would normally have opened, open very quickly at a smaller size than one would have expected. Again there is no proof and these observations are not as precise as one would like.

There is one more observation without proof ; I have seen small mushrooms grow in a flush which appeared and developed unusually quickly. While the rest of a house was producing normal sized mushrooms, with a period of ten days from clearing one flush to clearing the next, one bed came through fairly quickly after clearing a flush, and the following one also was cleared within a week. In this instance too I think watering was responsible, but I do not know whether it was quantity of water, time of application, previous state of the bed, or a combination of these which caused the effect, if indeed I am right in believing that the quick flushing and small size were associated.

At the risk therefore of being very unpopular, I suggest that those who suffer with small mushrooms should consider carefully whether their own management, particularly watering and ventilation, may be responsible. To forestall some of the protests I will conclude by repeating that I do not think the causes I have mentioned are responsible for all cases of small mushrooms, but I think they do account for some of them.

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# THE FRED. ATKINS ALPHABET–T

**Taint.** The mixing of BHC with compost to kill pests is dangerous if the compost is later to be used to manure land in which edible roots, particularly potatoes, will be grown. Lindane is a purer form, and correspondingly more costly, and is *said* not to taint subsequent crops. Recommended dosages of BHC or lindane have never been reported to taint the mushroom itself, but I saw a statement recently where mushrooms from beds which had been treated with lindane developed the musty odor (the report came from the States) associated with BHC *some months after being canned.*

**Tamps.** Instruments, usually home-made, used to firm the compost and/or casing. How firm should the compost be? It depends on the compost. How firm should the casing be? It depends on the casing.

**Tariffs.** It is generally believed that the 50 *per cent.* import duty imposed on mushrooms in 1931 saved the Mushroom Industry. It is too early yet to see what effect, if any, the new tariff of December, 1953, has on imports. It provides for a 20% *ad valorem* duty in October-April and 10% in May-September.

*Tarsonemidae.* According to *Ministry Bulletin* 34, no direct injury to mushrooms or spawn has ever been traced to these " red pepper mites." If they *are* predators on other mites, I wonder if Jo Michaels introduces them to his beds to justify his " biological control " theory!

**Temperature.** I offer a half-pound of " the noblest of them all " to any grower who will define " temperature " in a short paragraph and cover all its significance in mushroom growing. I am baulked at the outset by having seen perfect mushrooms grown in Johannesburg at 65° F., in Copenhagen at 60°, in Paris at 55°, and in the Belgian Limburg at 50°.

**TEPP.** Tetraethyl-pyrophosphate, which is twice as strong as HETP, is a control for some types of mite. Don't hear much about it nowadays; why? Because it is extremely poisonous?

**Thallus.** The vegetative body of a thallophyte such as the mushroom. It was Bulloch, I believe, who suggested that the " Found " cry at a fungus foray might be " Thalli ho!"

**Thermometer.** One really good " master " thermometer is a sound investment. We use one to check up on the discrepancies of our cheaper " commercial " thermometers. And, by golly, sometimes these want checking.

**Thiamine.** One of the members of the Vitamin B complex with which the cultivated mushroom teems, despite anything H. B. Luxmoore publishes!

**Thiocyanate.** Kligman tells us " the addition of a thiocyanate to a pyrethrum dust enhances its effectiveness and increases the residual effect." This is surely too important a fact to be lost in a textbook. Is it used in Britain? Will any manufacturer tell us? We pay insufficient attention to pyrethrum nowadays.

# THE PROOF OF THE SPAWN— IS IN THE CROPPING!

Messrs. R. H. & R. S. Fryer, and below, a view of their farm at Chesham.

**NASHLEIGH MUSHROOM FARM Ltd.**

Market Gardeners

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R. H. Fryer
R. S. Fryer

Telephone Chesham 219

6th November 1954

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You may be interested to learn that in a carton of 5 lbs. of spawn we have just received 3½ lbs. will usually of 3 weeks 4 days and it seems likely will produce another 1½ lbs. in the stop that by the end of 2 lbs. in a day or will have another four weeks.

Yours faithfully,

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# SOIL HEATING BY ELECTRIC CABLES OR WIRES

*By* *LOHEAT LTD.

An interesting post-war development in horticulture has been the attempt to warm soil directly by buried cables or wires, instead of using the indirect sequence of warming the air, and waiting for the latter to pass on some of its heat to the soil. Such a process may take up to three weeks, in unfavourable conditions, and even at the end of the period, the soil may not have acquired sufficient warmth to encourage good root growth. Compare this with the soil in which warmed wires are buried, enabling the temperature to be raised to 60° F. in 36 hours or less, from a cold condition. Moreover, this temperature can exist well down in the soil, or near the surface of the soil, according to the depth of the wires.

The use of such warming equipment makes possible much earlier planting in greenhouses, and tomato plants growing in this warmed soil form good root systems, and grow away, instead of becoming blue and hard, through lack of progress.

In case it may be asked what all this tomato and greenhouse business has to do with the mushroom grower, let us hasten to say that if glasshouse soil can be warmed, so can soil and compost in the mushroom house, and possibly there are dividends to be gained in a largely unexplored field. Soil warming has been tried, with varying success, in mushroom sheds. In one case that we know of, the grower pronounced the system satisfactory as regards temperature attainment, but unsatisfactory by reason of the drying-out of the compost. In this instance, growing was carried out on shelves in well insulated Nissen huts. In another case, the grower complained of corrosion of the element wires, but this could readily be overcome by the use of sheathed wires.

One feature of warming by buried wires is that the generated heat is applied *where it is wanted*, and not allowed to drift *uselessly up to the roof of the house*, and then to the outside air. By choosing suitable electrical loadings, temperatures of 60, 70, 80, or even 90° F. can be attained in the soil, and are readily controllable by thermostat and relay gear. Again, it may not always be required to have all the beds in a house heated to maximum temperature. With air heating, however, the system must be adjusted to suit the bed needing the highest temperature. Using buried wires, any bed can be selected for warming, without wasting electrical energy on the others, and running costs are thereby cut.

For safety and reliability, the low voltage form of warming has much which commends it. Accidental contact with the heating wires does not produce electric shocks, and the wires are at a sufficiently low temperature to present no form of fire hazard. Being of a relatively heavy gauge—usually 12 S.W.G. (.104″)—and of mild steel, they can scarcely be broken accidentally. *With normal soil conditions, the bare wires will last for five years or more, while the plastic sheathed wires will last for many additional years*, if due care is taken not to damage the sheathing during installation. When the time for replacement comes,

*Loheat Ltd., Eddington Works, Hungerford, Berks.

the wires are quite inexpensive to buy, though we would like to emphasize here that it is not safe merely to visit the nearest hardware shop, and buy a certain gauge of wire. The electrical properties of galvanized wire vary a great deal, and damage, or inferior performance, will most probably be the result of hoping that a given gauge of wire has the same electrical resistance as that which it is to replace.

The source of the low voltage electricity is the step-down transformer, which is the most expensive item of the set. Its life, however, should be almost as long as that of its user, and it requires little attention other than an occasional cleaning of terminals, and repainting of the case. It can be stationed within the mushroom house, or outside, as convenient, since it is normally built to withstand the weather.

The cost of buying and installing low voltage soil warming equipment varies, of course, with the area to be warmed, and the maximum temperature to be maintained. It is reckoned that electrical energy at the rate of 6 or 7 watts per square foot of soil will raise the temperature of the soil in a greenhouse to 58° F. in a matter of 36 hours, during the depths of winter, and thereafter only occasional dosage is needed to maintain this level. *The total cost of electrical energy over an 8 weeks period, during the winter, is likely to be not more than 2d. per square foot*, for this sort of temperature, with the greenhouse air temperature averaging 50° F. As the mushroom house is likely to be much better for heat retention than a glasshouse, it is reasonable to suppose that a very much *lower rate* of soil heating would be needed for the same temperature.

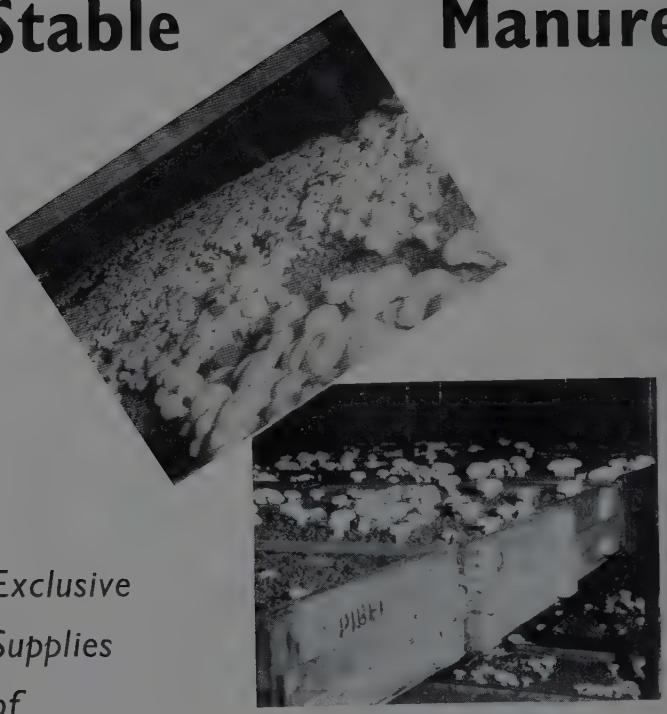
A set of low voltage soil warming equipment to warm 1,000 square feet of ground beds under the above conditions would cost about £50 to buy and install, using a method of alternate dosage. The area would be divided into two halves, and the soil temperature would be raised in one section at a time, being maintained thereafter by alternate doses of energy. In this way the equipment need have capacity for only half the area at a time, and therefore costs less.

The dosage method is not so desirable for shelves, however, since the smaller mass of soil does not retain the heat for sufficient time. In this case the equipment must have the capacity to deal with the whole area at once, and it will be controlled, for preference, by a thermostat. The cost for 1,000 square feet of shelves would then be much higher, probably between £80 and £90.

Whether this particular method of warming the mushroom house, or beds, has any advantages to offer is not yet known, but it is becoming well established in the horticultural world, and *may repay study by the mushroom grower.*

**Fred. Atkins comments:** Your contributors are unaware of the Banninger plant in Switzerland, the investigations of Dr. and Mrs. Bels in Holland, and the extensive research of Dr. and Mrs. Hauser and Dr. Sinden in Switzerland, who have abandoned the idea. Perhaps Editor Alderton could persuade Mrs. Hauser to summarise for us the advantages and disadvantages. In the Tray System it is obviously impracticable; in shelves the difficulties, I know, were very considerable.

# Stable Manure



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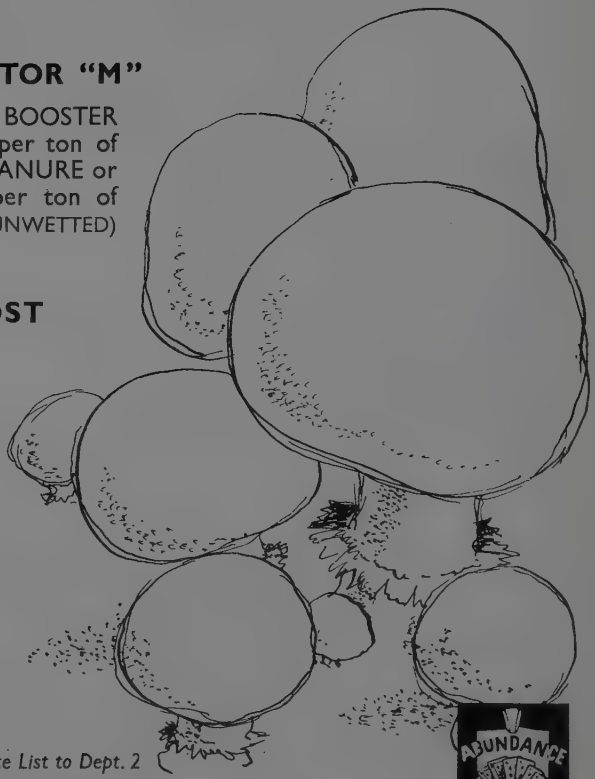

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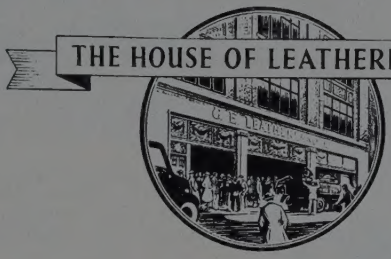


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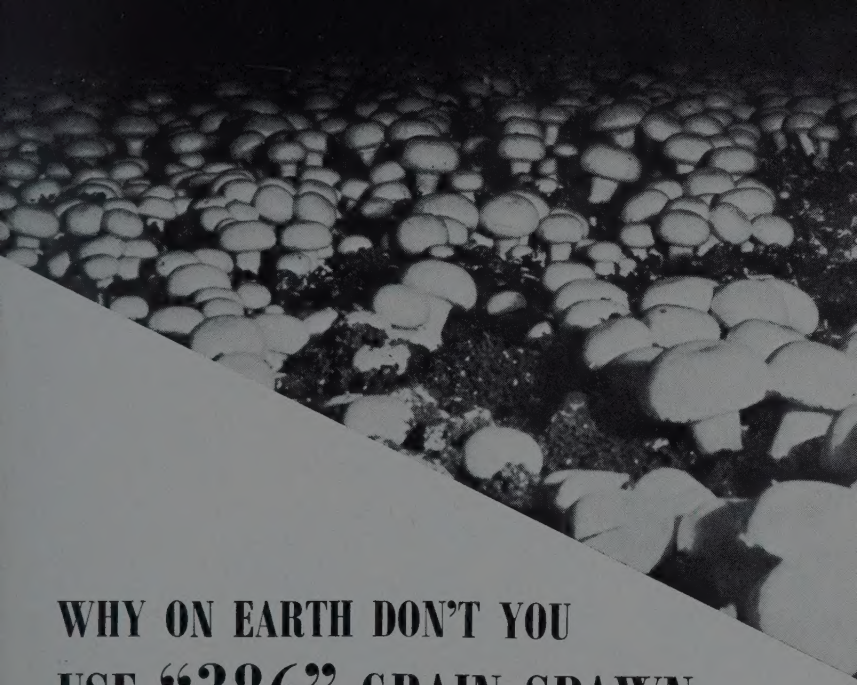

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